



## **Heavy precipitation and the responses within emergency management – a new approach for emergency planning and disaster prevention by utilizing fire brigade operation data**

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An increase of intense rainfall events in the center regions of Europe is one of the assumed effects of climate change. Climate scenarios indicate also large seasonal and regional differences concerning the magnitude. Structural damages and financial loss resulting from heavy precipitation depend on natural parameters such as topography and vegetation cover of the specific area, but also on socio-economic parameters such as urbanized and industrialized areas, population density and the presence of critical infrastructure. In particular mudflows and floods cause damages such as flooded basements and streets, undercutting of roads or spilled sewage drains.

The emergency management has to consider these effects appropriately. Commonly, this is the responsibilities is taken by the fire brigades and civil protection units. Within their daily routines, numerous data is collected, but commonly not utilized for scientific purposes. In particular fire brigade operation data can be used accordingly to describe the intensity of the aftermath when heavy precipitation strikes a certain area. One application is described in this study based on a example in Offenbach, Germany.

The civil protection in Germany is based on a federal system with a bottom-up command-structure and responsibility to the local community. Therefore it is not easy to collect the overall incident data for a widespread affected area. To examine particular local effects of heavy precipitation events it is necessary to match the meteorological data provided by the German Meteorological Service (DWD) with the incident data of all effected fire brigades, which sometimes is impeded by the usual resolution of meteorological data. In this study, a method of comprehensive evaluation of meteorological data and the operation data from local fire brigades has been developed for the Rhine-Main-Area. This area is one of the largest metropolitan regions in Germany with a very high density in population as well as industrial and traffic infrastructure. This new concept might support a sophisticated emergency planning and also better disaster prevention efforts for the authorities. Especially municipal civil protection authorities are liable to prepare new strategies and emergency plans for their particular field of responsibility, regarding their neighbor communities and to cope the “German national adaption strategy to the climate change” as a future goal.

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